

This is the general heading for the organisation and control of non-positive displacement pumps, blowers, compressors, exhausters and fans; and with some exceptions is also general for sub-systems and components in such devices

Certain associative subject matter is also included

Explanation of heading subject matter and relationships with other headings

For the purposes of this heading a non-positive displacement pump &c is a device in which the displacement of fluid by the device is not directly proportional to the angle of rotation or other amplitude of movement of the impeller of the device, but is instead principally a function of the angular speed or other velocity of the impeller

Such devices principally include centrifugal, centripetal, single screw (*ie* not meshing-screw) and axial flow pumps, blowers, compressors, exhausters and fans. Also included are:

- . centrifugal and centripetal ejector pumps
- . centrifugal and axial flow Sprengel pumps
- . coiled-tube type rotary pumps
- . liquid-ring pumps
- . molecular vacuum pumps
- . paddle-wheel pumps
- . pumps operating by fluid friction
- . ventilating fans
- . viscosity pumps

Structurally equivalent devices

Turbines are structural equivalents of non-positive displacement pumps, &c and consideration of search in F1T, Turbine devices, is necessary in certain subjects

This is indicated by reference to affinity with F1T following a classifying term. Turbines useable without modification as non-positive displacement pumps, &c are classified in F1T, Turbine devices

Screw conveyers are structurally equivalent to screw pumps and search in B8A, Conveyers &c should also be considered for these devices

Associations with functionally different apparatus; plural arrangements of pumps

The heading is not complete for this subject matter. A complete search should extend to the heading(s) for the associated pump or other apparatus

The following headings may, *inter alia*, need to be considered:

- B1D, Filtering and settling
- B1T, Separating particles from gases
- B2A, Comminuting
- B2P, Centrifuges
- F1E, Injectors and ejectors
- F1F, Rotary positive displacement devices
- F1U, Peristaltic devices
- F1W, Fluid-pressure reciprocating machines
- F4V, Ventilation and air conditioning

Gas turbine-compressor combinations are classified in F1G, Gas turbine plant

Fans and fan blades of conventional design attached to other apparatus are classified in the heading for the other apparatus

Control, regulation and adjustment

All aspects of control regulation and adjustment of individual devices of this heading are classified here *including* manual, programmed and condition responsive arrangements

Control devices and systems of more general interest are classified in such headings as:

- G3B, Speed governors
- G3N, Automatic electric control systems
- G3R, Electric retroactive control
- H2J, Electric motor operating arrangements

Control, regulation and adjustment of bladed rotors and/or stators *per se* is subject matter for F1V, Bladed rotors and stators

Control or plural arrangements of pumps is classified under the particular plural arrangement concerned

Explanation of subject matter—contPump &c organisation

Classified here are disclosures concerned with the general arrangement of pumps &c *eg* relationships between components and sub-systems thereof and combinations of *unit functions* (*See below*).

The arrangement and relative disposition of bladed rotors and stators only, is subject matter for F1V, Bladed rotors and stators

Excluded are:

- . abrasive throwing wheels. *See* B3D, Abrading
- . air douches. *See* A5R, Medical, dental and veterinary equipment
- . meshing screw pumps. *See* F1F, Rotary positive displacement devices

Unit functions &c

Classified here are those functions specified in the corresponding part of the Classifying Schedule. Also found here are components, elements and sub-systems of significance *per se*

Excluded are:

- . bladed rotors, bladed stators and operative combinations thereof (*including* construction and mounting of blades thereon). *See* F1V, Bladed rotors and stators
- . centrifugal balancing of bladed rotors. *See* F1V, Bladed rotors and stators
- . construction of shafts. *See* F2U, Rollers, shafts &c
- . driving by elastic fluid turbine or wind motor combined structurally with impeller. *See* F1T, Turbines
- . gearing of general interest. *See* such headings as B7E, Cycle; human power driving systems, and F2Q, Gearing elements &c
- . guards and protectors and safety devices controlling or controlled by machinery, for preventing injury to persons by machinery. *See* F2J, Machinery guards &c
- . indicating and recording vibrations. *See* G1J, Expressing measurement &c
- . reducing surface friction or fluid flow resistance by controlling the fluid at the boundary layer. *See* F2R, Boundary layer control
- . securing rotors on shafts. *See* F2U, Rollers, shafts &c
- . shaft couplings. *See* F2U, Rollers, shafts &c
- . silencing gas suction and delivery. *See* F1B, Internal combustion engines &c
- . stuffing boxes. *See* F2B, Seals
- . testing and investigating balance of rotary parts. *See* G1X, Miscellaneous measurement

The exclusion references listed in this heading are not exhaustive. Reference should be made to the appropriate general heading/s for processes, materials, elements or devices which may be more widely applicable than can appropriately be classified in this heading

Classifying, Indexing and Searching Note

The heading is provided with a single Classifying Schedule and a series of Indexing Schedules, terms from which are assignable as follows:

terms from Indexing Schedules 1,2,3 and 6 are assignable with all classifying terms

terms C401 to C404 inclusive from Indexing Schedule 4 are assignable only with classifying terms CFB and CFC

terms C411 to C425 inclusive from Indexing Schedule 4 are assignable only with classifying terms CD and CFAC, with the exception that indexing term C416 is also assignable with classifying term CFAB

terms from Indexing Schedule 5 are assignable only with classifying terms CBA to CBH inclusive, CD, CFV and CFY

In other respects the normal rules for the use of classifying and indexing terms as set out in the Notes on the use of the Classification Key are applicable

Definitions

For convenience, the non-positive displacement pumps with which this heading is concerned are referred to in the Classifying Schedule as “NPD pumps”

The term “pumps” as used herein denotes also blowers, compressors, exhausters and fans

Relationship with the Universal Indexing Schedules (heading U1S)

In addition to recording the nature of broader processes or apparatus with or in which inventions classified here may be used, U1S is used, subject to its indexing rules, to index materials operated on

Operative date for Key entries

The operative date for the terms of this heading is that of Edition D

The terms of Indexing Schedule 5 correspond generally to the C2J—and CD2J—terms of Edition C and earlier Editions

Classifying Schedule

- CA associations between one or more NPD pumps and functionally different apparatus or device plural arrangements of pumps at least one of which is an NPD pump (*including* control, regulation and adjustment thereof)—
 . pumps in series only—
- CBA . . of one type only
- CBB . . other than the above
 . pumps in parallel only—
- CBC . . of one type only
- CBD . . other than the above
 . series/parallel arrangements *including* arrangements convertible between series and parallel operation—
- CBE . . comprising pumps of one type only
- CBF . . other than the above
 . other plural pump arrangements—
- CBG . . comprising pumps of one type only
- CBH . . other than the above
- CC NPD pumps convertible from one NPD type to another, into other types of pump or into other apparatus
- CD control, regulation and adjustment of individual NPD pumps
 . mere indicators. *See* term CFY *below*
- CE organisation of individual NPD pumps
 unit functions, sub-systems and elements, perfecting and ancillary features—
 . driving—
 . . direct drives—
- CFAA . . . motor combined with impeller
- CFAB . . . other than the above
- CFAC . . indirect drives
- CFB . bearing arrangements—(affinity exists with F1T, Turbine devices)
- CFC . lubricating—(affinity exists with F1T, Turbine devices)
 . guide bodies and baffles—(affinity exists with F4V, Ventilation and air conditioning)
- CFDA . . fixed
 . . other than fixed—
- CFDB . . . rotary (*including* rotary diffusers and casings)
- CFDC . . . other than rotary
- CFE . casing wall constructions—(affinity exists with F1T, Turbine devices)
 . . shape characteristics of casing walls forming boundaries of fluid passages. *See* terms CFF—*below*
 . . stationary shrouding surrounding rotor blade tips of turbines. *See* F1T, Turbine devices
 . arrangement, form and disposition of fluid passages (*including* fixed diffusers)—(affinity exists with F4V, Ventilation and air conditioning)
- CFFA . . overall arrangement
 . . inlets—
- CFFB . . . multiple
- CFFC . . . movable
- CFFD . . . other than the above
 . . outlets—
- CFFE . . . multiple
- CFFF . . . movable
- CFFG . . . other than the above
- CFFH . . in impeller chamber

Classifying Schedule—cont.

- CFGA . mounting and supporting—
- CFGB . . to permit automatic movement
- CFH . . other than the above (affinity exists with F1T, Turbine devices)
- CFH . constructions of non-bladed (*eg* helical) impellers—(affinity exists with F1T, Turbine devices)
- CFJ . construction of bladed impellers. *See* F1V, Bladed rotors and stators
- CFJ . assembling, dismantling, cleaning and inspecting
- CFJ . priming; preventing vapour lock—
- CFKA . . self-priming
- CFKA . . using priming pumps; using booster pumps to prevent vapour lock—
- CFKB . . . of jet type
- CFKC . . . of other type
- CFKA . cooling and heating—
- CFLA . . intercooling
- CFLB . . other than the above
- CFLB . . . cooling blades. *See* F1V, Bladed rotors and stators
- CFM . reversal of hand
- CFM . balancing—(affinity exists with F1T, Turbine devices)—
- CFNA . . end thrust (*including* leakage adjusting devices therefor)
- CFNB . . other than the above *eg* radial
- CFNB . preventing or disposing of leakage—(affinity exists with F1T, Turbine devices)—
- CFPA . . shaft seals
- CFPB . . other than the above
- CFPB . . . stationary shrouding surrounding rotor blade tips. *See* F1T, Turbine devices
- CFPB . . . otherwise preventing leakage in region of blades. *See* F1V, Bladed rotors and stators
- CFQ . fire prevention
- CFR . testing operation
- CFS . reducing noise and vibration
- CFS . . through the use of particular mountings. *See* terms CFG- *above*
- CFS . . by construction of bladed rotor or stator. *See* F1V, Bladed rotors and stators
- CFS . preventing and adjusting for wear—
- CFTA . . protective linings
- CFTB . . other than the above
- CFU . facilitating or enabling carrying or transporting
- CFV . reversing direction of flow
- CFV . design or adaptation for special fields of use—
- CFWA . . for flotation
- CFWB . . for permitting operation whilst submerged
- CFWC . . for pumping materials having characteristics affecting design (*eg* highly corrosive or abrasive materials)
 and not provided for above
- CFWD . . other than the above
- CFY . indicating particular operating parameters
- CFY . . as part of a control operation. *See* term CD *above*
- CX . aspects of NPD pumps *not provided for elsewhere in this or any other heading*

Indexing Schedule 1

Terms from this Schedule are assignable with all classifying terms

- kinds or types of non-positive displacement pump—
- . axial flow—
 - C101 . . with oppositely-rotating impellers
 - C102 . . worm
 - C103 . . other
 - . centrifugal—
 - C104 . . bladed or unspecified
 - . . non-bladed—
 - C105 . . . fluid friction or serrated
 - C106 . . . rotary chamber
 - C107 . . . rotary tube or channel
 - C115 . . . other than the above
 - C108 . centripetal
 - C109 . circumferential flow
 - C110 . helico-centrifugal or mixed flow
 - C111 . liquid-ring
 - C112 . rotary ejector and Sprengel
 - C113 . transverse-flow
 - C114 . other or unspecified type

Indexing Schedule 2

Terms from this Schedule are assignable with all classifying terms

- associated pumps—
- C121 . rotary positive displacement
 - C122 . reciprocating
 - C123 . injectors/ejectors
 - C124 . peristaltic
 - C125 . other than the above
- associated apparatus and devices *other than* pumps—
- C201 . cutting or comminuting means
 - C202 . filters
 - C203 . separators *other than* filters
 - C204 . other apparatus and devices

Indexing Schedule 3

Terms from this Schedule are assignable with all classifying terms

- characteristics of materials pumped—
- C301 . high temperature
 - C302 . corrosive
 - C303 . abrasive
 - C304 . high viscosity
 - C305 . radio-active
 - C306 . non-homogeneous
 - C307 . low-density gases

Indexing Schedule 4

Terms C401 to C404 inclusive are assignable only with classifying terms CFB and CFC

Terms C411 to C425 inclusive are assignable only with classifying terms CD and CFAC with the exception that term C416 is also assignable with classifying term CFAB

bearings—
 C401 . fluid
 C402 . magnetic
 C403 . roller/ball
 C404 . other than the above

transmission type—
 . gearing—
 C411 . . toothed
 C412 . . friction
 C413 . pulley and cord or chain
 C414 . electric
 C415 . fluid
 C416 . flexible or cardan shaft
 C417 . other type

clutches and couplings—
 C421 . friction
 C422 . magnetic
 C423 . fluid
 C424 . one-way clutches
 C425 . other or unspecified type

Indexing Schedule 5

Terms from this Schedule are assignable only with classifying terms CBA to CBH inclusive, CD, CFV and CFY

control, regulation and adjustment of operation—
 . automatically in accordance with—
 C501 . . pressure
 C502 . . speed
 C503 . . temperature
 C504 . . volumetric or mass flow or fluid velocity
 C505 . . other variables
 . by—
 C511 . . injecting additional fluid
 C512 . . modifying casings
 C513 . . controlling and regulating driving motor
 C514 . . transmission couplings, gearing and brakes
 C515 . . impeller or stator blades, adjusting and varying angularity or position of
 C516 . . impellers and casings, moving relatively
 C517 . . impellers and stator blades adapted optionally to freewheel
 C518 . . guides and baffles, adjusting and varying angularity, position or form of
 . . valves, shutters and orifices operating on working fluid—
 C519 . . . blow-off, by-pass and relief
 C520 . . . non-return
 C521 . . . throttle and stop
 C522 . . whirl at entry, varying
 C523 . . other means
 C530 . manual control, regulation or adjustment

Indexing Schedule 6

Terms from this Schedule are assignable with all classifying terms

driving means—
 C601 . electric motor
 . fluid actuated motor—
 . . rotary—
 C602 . . . turbine
 C603 . . . other rotary
 C604 . . reciprocating
 C605 . . other or unspecified
 C606 . hand or foot
 C607 . other or unspecified driving means